

REMARKS

This responds to the Office Action mailed on July 20, 2006.

In this response, no claims are amended, no claims are canceled, and no claims are added; as a result, claims 1-20 are now pending in this application.

§101 Rejection of the Claims

Claims 1-20 were rejected under 35 USC § 101 in the Office Action mailed on January 30, 2006 because that Office Action contended that the claimed invention is directed to non-statutory subject matter. In its response, the Applicant traversed that rejection, but nevertheless amended the claims to recite that the claimed method, machine-accessible medium, and process are related to solving a scheduling problem in a particular business operation. Notwithstanding the Applicant's amendment, the present Office Action continues to reject claims 1-20 under 35 USC § 101. The Applicant continues to respectfully traverse this rejection.

The claimed invention is directed to statutory subject matter. The Applicant directs the Office's attention to the background of the present application, where it sets forth the real world environment in which the claimed invention operates. It describes that operators of plants are faced with many different types of decisions as to what to make, when to satisfy customer demand, and how to optimize profits. It sets forth a real world operations problem of current methods being unable to solve planning and scheduling problems within a reasonable time, and if they do provide a solution, it may be a local maximum, and not the best or optimal solution. Still further, the solution may not even be feasible.

It should also be noted that operators of manufacturing plants are intimately familiar with the variables and constraints associated with the operations of their plants, and are well able to set up quadratic equations to address such variables and constraints. Still further, each plant likely has different sets of variables and constraints, and the identification and selection of such are not a part of the invention. As preferred by the Patent Office, well known aspects are preferably not described in detail.

The Office Action states that while the claims recite the solution is a schedule for a manufacturing process, the Office Action contends that the claims do not clarify how the

mathematical operations are specifically adapted to yield a specific, substantial or credible result in relation to the schedule for operating the manufacturing process. This statement is respectfully traversed. Claim 1 specifically sets forth how the equations are solved by applying a bound propagation process, a local linear bounding process, a local linearization process, and a global subdivision search. Thus, not only does it specify how the equations are solved, it provides the additional utility of determining whether the solution is optimal, feasible or infeasible.

The Applicant further respectfully submits that the utility requirement does not require that the specific, substantial and credible utility be recited in the claims. MPEP § 2107 II. Additionally, there is no requirement that any mathematical operations recited in a claim be adapted to achieve a specific, substantial or credible result. It is the claims as a whole which must accomplish such a result. Clearly, a schedule for a plant is such a result.

The Applicant respectfully submits that the claims describe whether a solution to a scheduling problem of a particular business operation is optimal, feasible, or infeasible. As such, it is believed to overcome the rejection under 35 U.S.C. § 101. Just as the calculation of a share price in *State Street*¹ was a useful, concrete, and tangible result, the calculation of a solution to a scheduling problem in a particular business operation that can be applied to a multitude of businesses and industries, and the determination of whether that solution is optimal, feasible, or infeasible, is a useful, concrete, and tangible result. In fact, it is a useful, concrete, and tangible result that is crucial to making decisions in operating a plant to produce things, such as ice cream, as described in the background section.

The Final Office Action states that in order for the invention to be concrete, the claimed invention must produce a result that is substantially repeatable or reproducible. It goes on to state that since every permutation of variables, relationships, and constraints may be very different, any solution would not be substantially repeatable or reproducible. The Applicant respectfully submits that as recited in claim 1, for a particular “operations problem comprising a scheduling problem in a particular business operation,” a person of skill will know what variables, relationships, and constraints to use, and further will know what quadratic equations to

¹ *State Street Bank & Trust Co. v. Signature Financial Group, Inc.*, 149, F.3d, 1368, 1373, 47 USPQ2d 1596, 1601-02 (Fed. Cir. 1998).

construct. These variables, relationships, constraints, and quadratic equations will produce repeatable results for each particular situation. This is just as concrete as the calculation of a share price in *State Street*, for the calculation of a share price in *State Street* is repeatable and reproducible if, and only if, the same situation is analyzed and/or the same data is used in the calculation. If not, an entirely new share price results from the calculation. The Applicant respectfully submits that that is one of the advantages of both the calculation of the share price in *State Street* and the solution to the operations problem in the present application.

The analogy on page 2 in the Final Office Action regarding the making of a dessert is at best irrelevant, and at worst is misleading. There is a clear distinction, and perhaps no relationship, between a batch of ingredients and the ability of a person of skill to concoct an unnamed dessert, and the use of variables, relationships, and constraints in a scheduling problem, solving non-convex equations by applying a bound propagation process, a local linear bounding process, a local linearization process, and a global subdivision search, and determining whether a solution to the scheduling problem is optimal, feasible, or infeasible.

Lastly, the Final Office Action states on page 3 that no real world effect is produced by the claimed invention, and that a solution may be found for a schedule without actually putting the schedule into practice. The Applicant respectfully submits that a scheduling problem in a particular business operation is a real world effect. And the contention that a solution may be found for a schedule without putting the schedule into practice actually highlights one of the advantages of the present invention---that is, a solution may be found, but will indeed not be put into practice if that solution is infeasible.

Consequently, for at least the foregoing reasons, the Applicant respectfully submits that the rejection under 35 U.S.C. §101 should be withdrawn.

§112 Rejection of the Claims

Claims 1-20 were rejected under 35 U.S.C. § 112, first paragraph, as failing to comply with the enablement requirement, and further rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. The Applicant respectfully traverses these rejections.

As explained in detail in the written description of the present application, in an embodiment, the variables recited in the claims may represent qualities, quantities, timing, and the like. Moreover, specific examples of one or more embodiments are provided in excruciating detail in the specification.² As pointed out *supra*, the Applicant respectfully submits that the subject matter of the claims are most assuredly reproducible and repeatable for any particular business or manufacturing process. The Applicant further respectfully submits that one of skill in the art of business and/or operations management would, without undue experimentation, be able to select pertinent variables for their processes and apply them to the subject matter as disclosed in the present application.

The Applicant therefore respectfully requests the withdrawal of the rejection of the claims under 35 USC § 112, first paragraph.

Regarding the rejection under 35 USC § 112, second paragraph, the Office Action states that the variables, relationships, and constraints of claims 1-20 are not explicitly defined. The Applicant respectfully disagrees. The specification states that in an embodiment, the variables may represent qualities, quantities, timing, and the like. The Applicant respectfully submits that a person of skill in business operations and/or manufacturing operations would be able to identify the variables that are pertinent to his or her industry (such as the quantity of oil in a tank in an oil refinery), and further would be able to use such variables and values in connection with the present disclosure.

The Applicant therefore respectfully requests the withdrawal of the rejection of the claims under 35 USC § 112, second paragraph.

§102 Rejection of the Claims

Claims 1-20 were rejected under 35 U.S.C. § 102(b) as being clearly anticipated by Hillier et al. (Introduction to Operations Research (6th ed)). The Applicant respectfully traverses this rejection.

Anticipation requires the disclosure in a single prior art reference of each element of the claim under consideration. *Verdegaal Bros. v. Union Oil Co. of California*, 814 F.2d 628, 631, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987). It is not enough, however, that the prior art reference

² Specification, pp. 13-42.

discloses all the claimed elements in isolation. Rather, “[a]nticipation requires the presence in a single prior reference disclosure of each and every element of the claimed invention, *arranged as in the claim.*” *Lindemann Maschinenfabrik GmbH v. American Hoist & Derrick Co.*, 730 F.2d 1452, 221 USPQ 481, 485 (Fed. Cir. 1984) (citing *Connell v. Sears, Roebuck & Co.*, 722 F.2d 1542, 220 USPQ 193 (Fed. Cir. 1983)) (*emphasis added*). “The identical invention must be shown in as complete detail as is contained in the ... claim.” *Richardson v. Suzuki Motor Co.*, 868 F.2d 1226, 1236, 9 USPQ2d 1913, 1920 (Fed. Cir. 1989); MPEP § 2131.

Moreover, whenever a claim is rejected, the ground of the rejection should be fully and clearly stated. Furthermore, an omnibus rejection of the claims is not informative.³

In rejecting the claims under 35 U.S.C. § 102(b) in the Office Action of January 30, 2006, the Office Action cited the entirety of Hillier et al., and in particular the table of contents, the index, and chapters 2, 3, and 13. In response, the Applicant stated that that rejection did not state the grounds thereof fully and clearly, and furthermore amounted to an omnibus rejection. In response to the Applicant’s contentions, the Final Office Action states that Hillier discusses a general approach for determining whether the solutions of a model are feasible or infeasible, that the goal is an optimal solution, and that Hillier applies an analysis to a specific scheduling problem to find an optimal solution. Notwithstanding the accuracy or inaccuracy of the Final Office Action’s interpretation of Hillier, the Final Office Action fails to identify where in Hillier elements of the claim are disclosed such as forming non-convex quadratic equations and solving the non-convex quadratic equations by applying a bound propagation process, a local linear bounding process, a local linearization process, and a global subdivision search. Consequently, a *prima facie* case of anticipation has not been established, and the Applicant respectfully submits that the rejection under 35 U.S.C. § 102(b) should be withdrawn.

³ MPEP § 707.07(d).

CONCLUSION

Applicant respectfully submits that the claims are in condition for allowance and notification to that effect is earnestly requested. The Examiner is invited to telephone Applicant's attorney 612-371-2140 to facilitate prosecution of this application.

If necessary, please charge any additional fees or credit overpayment to Deposit Account No. 19-0743.

Respectfully submitted,

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Date September 20, 2006

By


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CERTIFICATE UNDER 37 CFR 1.8: The undersigned hereby certifies that this correspondence is being deposited with the United States Postal Service with sufficient postage as first class mail, in an envelope addressed to: Mail Stop AF, Commissioner of Patents, P.O. Box 1450, Alexandria, VA 22313-1450 on this 20th day of September 2006.

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